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COMPARING SPATIO-TEMPORAL DYNAMICS OF NEANDERTHALS AND ANATOMICALLY MODERN HUMANS IN THE CANTABRIAN REGION OF THE IBERIAN PENINSULA

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Introduction

In the present study, we apply statistical analytical techniques to the available corpus of radiometric dates in order to reveal long-term palaeodemographic trends. These approaches are related to the assumption that changes in the frequency of radiocarbon dates are ed to anthropogenic events; in this manner, radiocarbon dates may be deployed as a proxy for relative past population change (Crema,2022). To mitigate the source-critical factors, we have performed an exhaustive review of all the pertinent dates selecting only those confidently placed between 45-30 ka years ago. Specifically, we calculated Summed Probabilistic Distribution (SPD) of carefully curated, calibrated radiocarbon dates. Comparing the summed density fluctuations of dates associated with both populations, we can identify the periods of increased or depressed population density that, in turn, may correspond to moments of arrival of one population and decline of the other.

Regional setting

The Cantabrian Region has more than 150 years of Palaeolithic research. This area contains one of the richest archaeological records on the presence of late Neanderthals and early AMHs. The abundance of shelters and caves in the region have allowed archaeological evidence of both species to have been preserved. This area is located to the north of the Iberian Peninsula (c. 42-44° N) and is limited to the north by the Cantabrian Sea (Figure. 1). This region has some key sites framed between 45-30 ka cal BP and containing layers attributed to the Mousterian, Châtelperronian, Protoaurignacian, Early Aurignacian, Evolved Aurignacian and Aurignacian technocomplexes. Also, we have included some dates framed in the Gravettian.

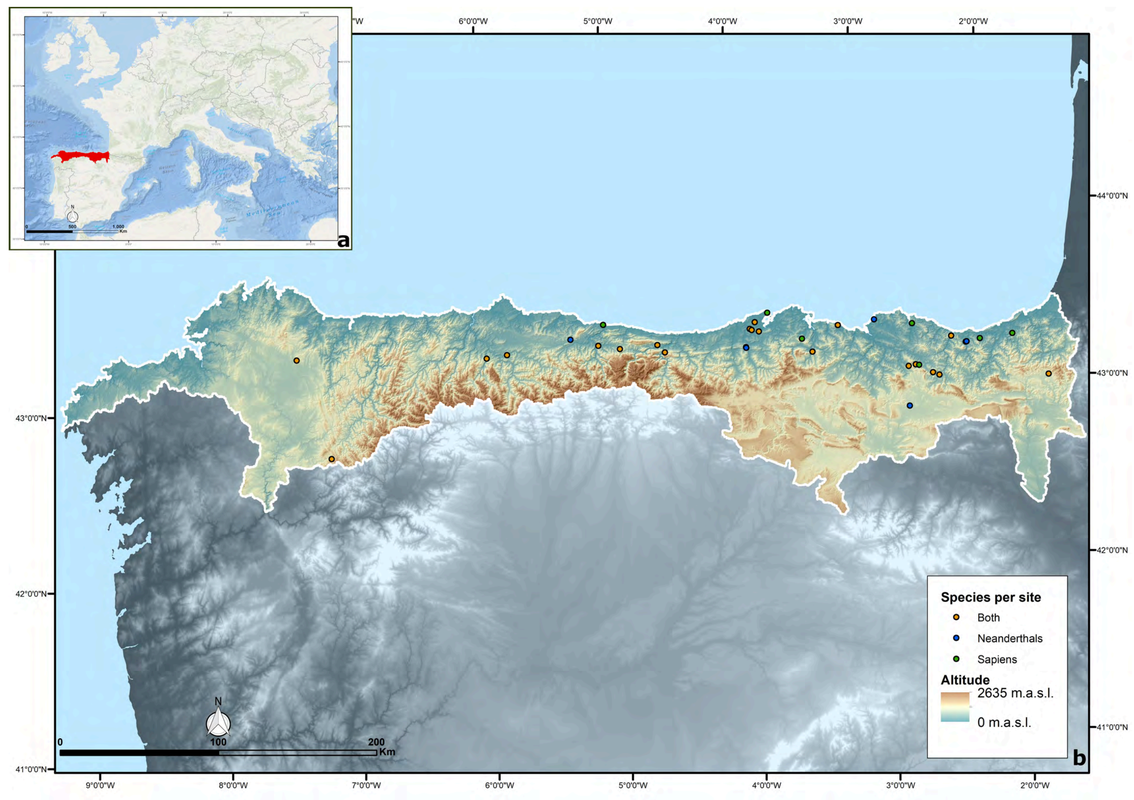

Figure 1. a) General location of the study area (red polygon). b) Detail of the study area with archaeological sites included in the analysis.

Material and methods

The radiometric database used in this study has been created from the sites dated between 45-30 uncalibrated ka years ago. The dates have been obtained from various sources (Bird et al., 2022; Vermeersch, 2020) and each site has subsequently been reviewed based on specialized bibliographical references. To perform the analysis, we have used R and the rcarbon package (Crema and Bevan, 2021). With the aim of creating the SPD and compare its distribution with the climatic events that occurred in that period. The workflow process is shown in Figure 2.

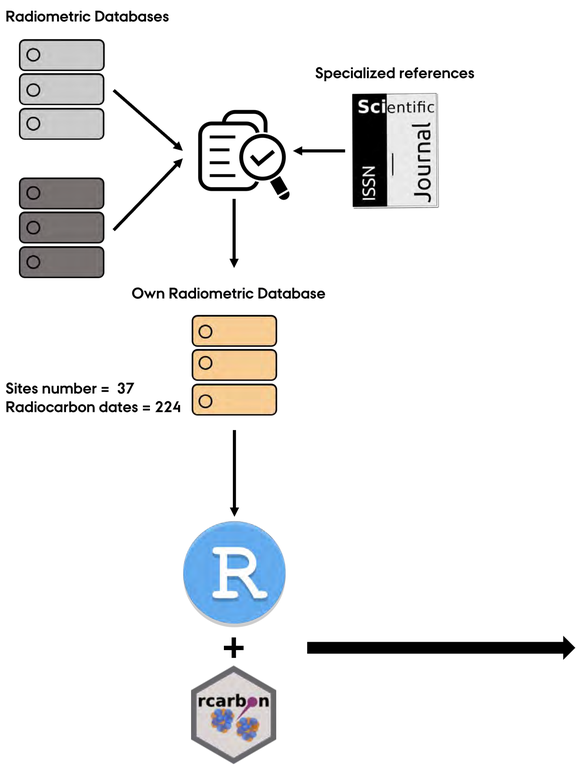

Figure 2. Workflow followed in the present study.

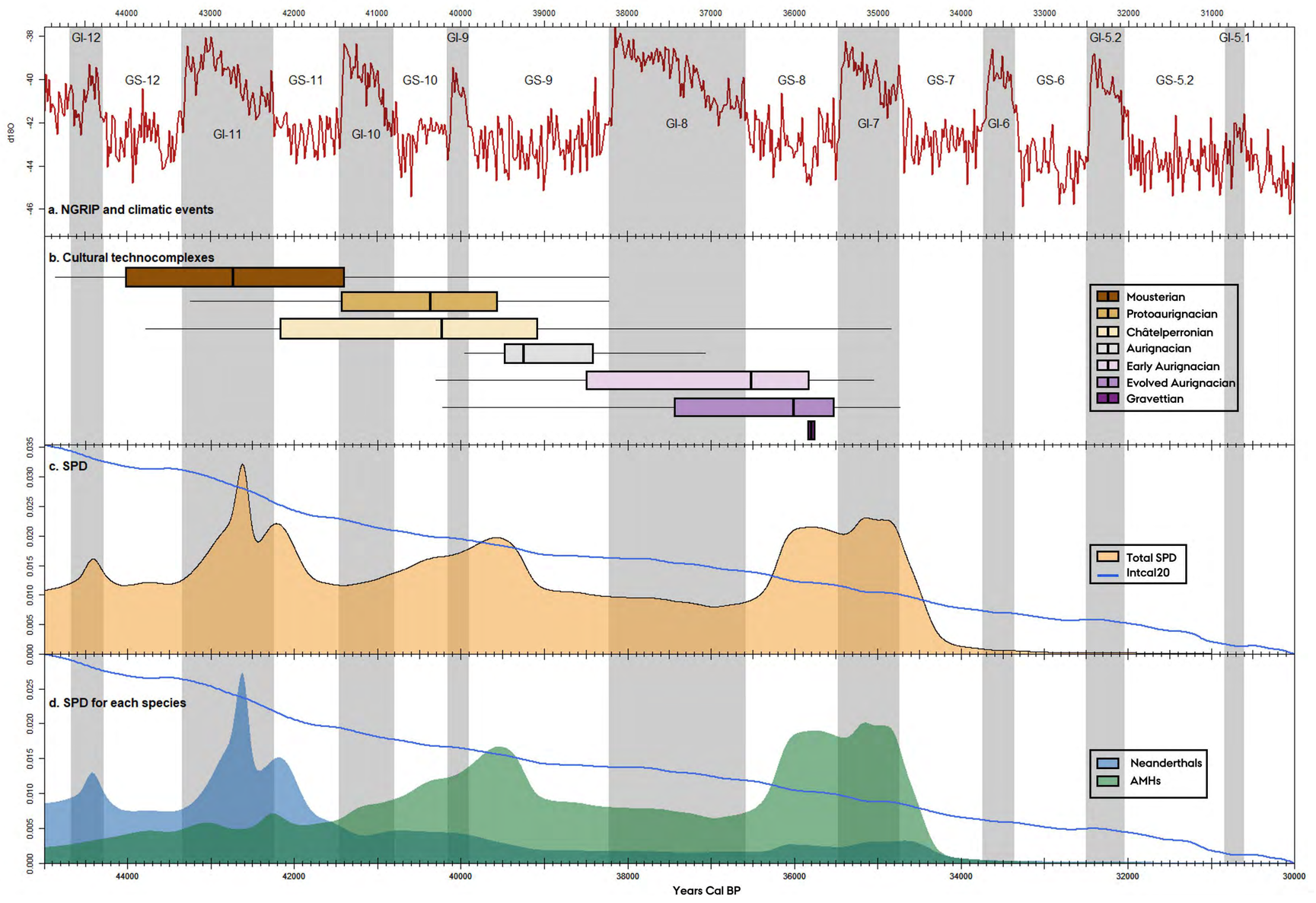

Figure 3. a) Proxy climate record obtained from the North Greenland Ice Core Project (NGRIP). b) Boxplots representing the mean cal BP dates for each technocomplex. c) SPD for all the radiocarbon dates. d) SPD for radiocarbon dates related with Neanderthal occupations (blue) and AMHs occupations (green). Code for creating the figure adapted from Hoebe et al., 2023.

Conclusions

- The different cultural technocomplexes follow one another over time, with the exception of the Châtelperronian and the Evolved Aurignacian, which overlap with the periods that precede them (Figure 3b).
- There are increased peaks coinciding with moments of warm periods (GI-12, GI-11 and GI-7) (Figure 3c). Although population density peaks are also observed in cold periods (GS-9 and GS8).
- In warm periods the Neanderthal population density increased, while in cold periods it remained stable and did not grow (Figure 3d).
- Around 41,600 cal BP there is a decrease in Neanderthal populations that contrasts with the increase in the population of AMHs. The latter do not seem to be affected by cold periods, since their population density increases during part of GS-9 and GS-8.
- A gap can be seen between 32-30 ka years ago, due to the selected dating sample ranges from 45 to 30 ka years ago, without calibration.

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